WHAT IS CLAIMED IS:

1. A ranging and positioning system to measure a distance between two radio sets which send and receive packets to and from each other and to determine a relative position of such two radio sets, said system being characterized in that the sending radio set transmits packets, the receiving radio set receives the packets and then sends them back after a certain length of time corresponding to an integral multiple of a prescribed unit time, and the sending radio set calculates the time required for packets to go and come back by subtracting the integral multiple of a prescribed unit time from the time taken from transmission of packets to reception of packets, thereby determining the distance between the sending and receiving radio sets according to the time required for packets to go and come back.

2. The ranging and positioning system as defined in Claim 1, wherein the prescribed unit time is determined from the quotient of the distance over which communication by the radio sets is possible divided by the velocity at which radio signals propagate.

3. The ranging and positioning system as defined in Claim 1, wherein the sending radio set measures the time taken from its transmission of packets to its reception of packets from the receiving radio set each time the sending radio set communicates with the receiving radio set, and

the sending radio set renews the result of distance measurement time to time.

4. The ranging and positioning system as defined in Claim 1, wherein the relative position is used after the result of measurement has been verified by the intensity of received signals and/or the result of packet demodulation.

5. The ranging and positioning system as defined in Claim 1, wherein each radio set has memory in which to store a list of its neighboring radio sets and to store ranging data of itself and each of its neighboring radio sets, and renews the content of memory each time it performs ranging.

6. The ranging and positioning system as defined in Claim 5, wherein each radio set acquires the ranging information possessed by its neighboring radio sets and determines its position relative to its neighboring radio sets from the thus acquired ranging information and its own ranging information.

7. The ranging and positioning system as defined in Claim 5, wherein one stationary radio set possesses information indicating that it is stationary and other radio sets detect this information by communication with the stationary radio set, thereby determining their respective

positions relative to the stationary radio set.

8. The ranging and positioning system as defined in Claim 1, wherein communication between two radio sets is accomplished twice in such a way that the time required for the receiving radio set to return packets is changed, so that the sending radio set cancels, by using the results of two measurements, errors resulting from the accuracy of measurements of the prescribed time by the receiving radio set.

9. The ranging and positioning system as defined in Claim 1, wherein two or more radio sets are arranged such that a specific positional relation is established among their antennas and each radio set fills the gap between the nominal value and the actual value of the time taken from its detection of packets to its transmission of packets by using the result of measurement compared with the known relative distance.

10. The ranging and positioning system as defined in Claim 1, wherein two or more radio sets are arranged such that a specific positional relation is established among their antennas and each radio set corrects errors of its own oscillator from the result of measurement compared with the known relative distance.

11. A ranging and positioning method for measuring a distance between two radio sets which send and receive packets to and from each other and to determine a relative position of such two radio sets, said method comprising a step in which the sending radio set transmits packets, a step in which the receiving radio set receives packets and then returns packets after a lapse of time corresponding to an integral multiple of a prescribed unit time, a step in which the sending radio set counts the time taken from transmission of packets to reception of returned packets, a step in which the sending radio set calculates the time required for packets to go and come back by subtracting the integral multiple of the prescribed unit time from the counted time, and a step in which the sending radio set determines the distance between the sending radio set and the receiving radio set from the time required for packets to go and come back.

12. The ranging and positioning method as defined in Claim 11, wherein the prescribed unit time is determined from the quotient of the distance over which communication by the radio sets is possible divided by the velocity at which wireless signals propagate.

13. The ranging and positioning method as defined in Claim 11, wherein distance measurement is executed only when the result of measurement by the radio set is verified

by the intensity of received signals and/or the result of packet demodulation.

14. The ranging and positioning method as defined in Claim 11, which further comprises a step in which each radio set stores a list of its neighboring radio sets and the ranging data of itself and each of its neighboring radio sets.

15. The ranging and positioning method as defined in Claim 14, which further comprises a step in which each radio set acquires the ranging information possessed by its neighboring radio sets, and a step in which each radio set determines its position relative to its neighboring radio sets from the thus acquired ranging information and its own ranging information.

16. The ranging and positioning method as defined in Claim 14, which further comprises a step in which each radio set detects the information of other stationary radio sets by communication with them, thereby determining its position relative to the stationary radio set.

17. The ranging and positioning method as defined in Claim 11, which further comprises a step in which the receiving radio set carries out communication twice in such a way that the time required for the receiving radio set to

return packets is changed, so that the sending radio set cancels, by using the results of two measurements, errors resulting from the accuracy of measurements of the prescribed time by the receiving radio set.

18. The ranging and positioning method as defined in Claim 11, which further comprises a step in which two or more radio sets are arranged such that a specific positional relation is established among their antennas and each radio set fills the gap between the nominal value and the actual value of the time taken from its detection of packets to its transmission of packets by using the result of measurement compared with the known relative distance.

19. The ranging and positioning method as defined in Claim 11, which further comprises a step in which two or more radio sets are arranged such that a specific positional relation is established among their antennas and each radio set corrects errors of its oscillator by using the result of measurement compared with the known relative distance.

20. A radio communication apparatus for ranging and positioning by means of packet transmission and reception, which comprises means of transmitting packets, means of detecting returned packets after a lapse of time that follows packet transmission which is equivalent to an integral

multiple of a prescribed unit time, means of measuring time that has elapsed from transmission of packet to detection of returned packets, and means of calculating the distance to the recipient of packets from the thus measured time.

21. The radio communication apparatus as defined in Claim 20, wherein the prescribed unit time is derived from the quotient of the distance over which communication with the radio communication apparatus is possible divided by the velocity at which radio signals propagate.

22. The radio communication apparatus as defined in Claim 20, wherein the packet detecting means detects the position for packet detection with the help of correlation between the receiving data and the spreading code.

23. The radio communication apparatus as defined in Claim 20, wherein the means of calculating the distance to the recipient of packets determines the time taken by the packet receiving radio set from its packet detection to its packet transmission on the basis of the integral multiple of the prescribed unit time, and converts for ranging the remainder after subtraction of the measured time from the thus determined time and the processing time of its own, into the propagation distance to the packet receiving radio set.

24. The radio communication apparatus as defined in Claim 20, wherein the means of calculating the distance judges the validity of the result of measurement by the radio set on the basis of the intensity of received signals and/or the result of packet demodulation, and, if the result of judgment is affirmative, executes the measurement of distance.

25. The radio communication apparatus as defined in Claim 20, which further comprises means of controlling the sending power of the radio set on the basis of the result of ranging by the means of calculating the distance.

26. The radio communication apparatus as defined in Claim 20, which further comprises means of controlling or limiting a specific function on the basis of the result of ranging by the means of calculating the distance.

27. The radio communication apparatus as defined in Claim 20, which further comprises means of performing communication for a specific function relating to security only when the relative distance is less than a prescribed value on the basis of the result of measurement by the means of calculating the distance.

28. The radio communication apparatus as defined in Claim 20, which further comprises means of reducing the

sending power and/or increasing the transmission rate according to the result of ranging by the means of calculating the distance, thereby intentionally making reception difficult for radio sets excluding a specific recipient.

29. The radio communication apparatus as defined in Claim 20, which further comprises means of storing a list of its neighboring radio sets and data of distance between itself and individual radio sets.

30. The radio communication apparatus as defined in Claim 29, which further comprises means of acquiring ranging information possessed by other radio sets, and means of deriving the position relative to its neighboring radio sets from the thus acquired ranging information and the raging information of its own.

31. The radio communication apparatus as defined in Claim 29, which is characterized in that each radio set has means of detecting through communication the information about stationary radio sets and then deriving its position relative to the stationary radio sets.

32. The radio communication apparatus as defined in Claim 31, which is characterized in that each radio set has means of combining the position information of three or more stationary radio sets with other position information

(such as sketch and map) and deriving, thereby mapping, its position or the position of other radio sets on the basis of the position information of other two or more radio sets.

33. The radio communication apparatus as defined in Claim 20, which further comprises means of canceling errors resulting from the accuracy of measurements of the prescribed time by the receiving radio set, on the basis of the results of two measurements carried out in such a way that the time required for the receiving radio set to return packets is changed.

34. The radio communication apparatus as defined in Claim 20, which further comprises means of filling the gap between the nominal value and the actual value of the time taken from the detection of packets to the transmission of packets by using the result of measurement compared with the known relative distance between the sending and receiving radio sets whose antennas are arranged in a specific relative position.

35. The radio communication apparatus as defined in Claim 20, which further comprises means of correcting errors of the oscillator by using the result of measurement compared with the known relative distance between the sending and receiving radio sets whose antennas are arranged in a specific relative position.